REMARKS

Claims 1, 2, 4-6, 9-11, 17, and 19-24 are presented for further examination. Claims 3, 7, 8, 12-16, and 18 have been canceled. Claims 1, 2, 4-6, 9-11, 17, and 19-24 have been amended.

In the Office Action mailed October 7, 2003, the Examiner objected to the specification, and in particular claim 2, because the variable "m" was not described in a previous claim, and in claim 18 "said routing step" and "said grouping step" were not properly described in a previous claim. The foregoing claim amendments have overcome these objections wherein claim 18 has been canceled and claim 2 has been amended along with claim 1.

Turning to the merits, claims 1, 2, 3, 22, and 23 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,576,875 ("Chawki et al.") in view of U.S. Patent No. 5,796,501 ("Sotom et al."). Claim 4 was rejected under 35 U.S.C. § 103(a) as unpatentable over Chawki et al. in view of Sotom et al. and further in view of U.S. Patent No. 6,020,986 ("Ball"). Claims 5-7, 9-14, 16-19, and 24 were rejected under 35 U.S.C. § 103(a) as unpatentable over Chawki et al. in view of Sotom et al. and further in view of U.S. Patent No. 5,289,302 ("Eda"). Claims 8, 15, and 20 were rejected as obvious over Chawki et al. in view of Sotom et al. and Eda, and further in view of U.S. Patent No. 5,646,758 ("Miki et al.").

Applicants respectfully disagree with the bases for the rejections and request reconsideration and further examination of the claims.

U.S. Patent No. 5,576,875

Chawki et al. teach a telecommunications network organized in reconfigurable wavelength-division-multiplexed optical loops. In particular, Chawki et al. teach using two wavelengths at each node, one for receiving and the other for transmission. In contrast, the connection node of the present invention uses one unique wavelength. As shown in Figure 2a of Chawki et al., an identical communication method is applied to both "B0" and "B1." In contrast, the present invention utilizes a communication method that, if applied to Chawki et al.'s Figure 2a, the method used in B0 would be different from that used in B1. According to the present invention, it is possible to increase the number of main node (main-ring) by using an identifying code (λ-tag), if necessary. Chawki et al. do not teach or suggest such features.

Moreover, Chawki et al. teach that a single wavelength can be sent to two stations (see column 5, lines 9-12). In this case, the two stations should use the same wavelength for transmitting data. Therefore, although Chawki et al. do not teach or suggest using modulation methods such as TDM or FDM for uploading, these methods must be used to prevent data collision between the two stations. However, in the present invention, these additional modulation methods are not required.

U.S. Patent No. 5,796,501

Sotom et al. are directed to a wavelength division multiplexing optical communication network wherein each node receives and transmits two wavelengths, one for message transmitting and the other for controlling. The control wavelength carries a clock signal having a form of synchronization pattern ST modulating. Sotom et al. teach that it is essential to have network synchronization for conveying a message because of its structure. Therefore, Sotom et al. teach periodically providing each node with a synchronization signal. However, the present invention does not require the control wavelength and the synchronization signal. Moreover, Sotom et al. teach each node responding to any message addressed to it by detecting its wavelength after receiving all the modulated signals. In the present invention, the connection nodes add/drop only their own unique wavelength.

U.S. Patent No. 5,289,302

Eda is directed to an access method for optical local area network systems. In this method, Eda teaches a control node (supervisory node 2) for delivering a transmission wavelength to a node that wishes to send data and then communication of each node is accomplished. In the present invention, communication of each node becomes accomplished with packet switching in the sub-ring controller or the main ring controller.

U.S. Patent No. 6,020,986 and U.S. Patent No. 5,646,758

In Figure 4 of the present application is one embodiment of a wavelength coupler that is installed at each of the terminals in the sub-ring and at each of the connection nodes in the main ring. While Ball's programmable add-drop module for use in an optical circuit may

contain similar components to those of the present invention, it fails to teach or suggest the technical features of the present claimed invention.

Miki et al. is directed to optical time compression multiplexing transmission systems that disclose some components, such as a receiving means and a decision means, but the overall system of Miki et al. is completely divorced from and completely different from the method of implementation of the present invention.

Discussion of Claims

Turning to the claims, claim 1 is directed to an Internet protocol over wavelength division multiplexing (WDM) network structure that has a plurality of sub-rings, a main ring for connecting an m number of the sub-rings, a sub-ring controller, and a main ring controller. Claim 1 further recites the main ring controller configured to drop all the wavelength division multiplexed signals flowing in the main ring itself, to extract the λ-tag information, switch incoming packets based on the λ-tag information, load packets on their unique wavelengths assigned to the respective sub-ring controller, and then transmit packets to the main ring. Claim 1 also recites the sub-ring controller configured to drop all the wavelength division multiplex signals flowing in the sub-ring itself to de-multiplex the signals, to load each of the signals on a unique link wavelength assigned to its terminals by using a destination address that is included in the packet, and then multiplexing again the signal to transmit it to the sub-ring when the destination terminal is located on the sub-ring itself and to add the identifying code (λ-tag) designating the sub-ring having a destination terminal of the packet, load the packet on its unique link wavelength assigned between the sub-ring controller and the main ring controller, and then transmitted to the connection node of the main ring when the destination terminal is located on the other sub-ring.

As discussed above, nowhere do Chawki et al. and Sotom et al., taken alone or in any combination thereof, teach or suggest the features recited in claim 1 when taken as a whole. More particularly, in the claimed invention, it is possible to increase the number of main nodes by using the λ-tag identifying code if necessary. In addition, no modulation methods are used or recited in the combination of claim 1. Applicants respectfully submit that claim 1 as well as all claims depending therefrom are clearly allowable over the references cited by the Examiner.

Independent claim 17 is directed to a method of transmitting and receiving packets in a sub-ring controller for controlling transmission and reception of the packets between any two terminals in an Internet protocol over a wavelength division multiplexing network. The method recited in claim 17 utilizes the features discussed above with respect to the structure of claim 1. Independent claim 22 is directed to an Internet protocol over a wavelength division multiplexing network structure that includes the limitations discussed above with respect to the references cited by the Examiner. Applicants respectfully submit that these independent claims and all claims depending therefrom are clearly allowable over the references for the reasons discussed above with respect to each of the cited references.

In view of the foregoing, applicants submit that all of the claims remaining in this application are now in condition for allowance. In the event the Examiner finds minor informalities that can be resolved by telephone conference, the Examiner is urged to contact applicants' undersigned representative by telephone at (206) 622-4900 in order to expeditiously resolve prosecution of this application. Consequently, early and favorable action allowing these claims and passing this case to issuance is respectfully solicited.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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